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EDITORIAL: 2 to 3- An omnibus of features & Policy issues in mathematics education

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Six months have rolled by like a blink of the geologic eye. This simile is translatable into a good Fermi problem involving units of time and proportional reasoning. As the reader will note the journal has moved from 2 to 3 issues a year, a simple arithmetical incremental for various reasons. Submissions to the journal have steadily increased. About a year or so ago, in my editorial in vol4.no2 [June 2007], I reported receipt of 86 manuscripts in 16 months. In the ensuing 12 months the journal received 107 submissions including several from angle trisectors, circle squarers and relativity debunkers, and 10 or so manuscripts in advanced pure mathematics that were beyond the scope of the journal. Sieving these submissions aside, the journal is averaging 90 manuscripts a year, with an acceptance rate of ~30%. The increase in the flow of manuscripts has created a severe backlog of articles necessitating an increase in frequency of issues per year. Henceforth the journal will move to 3 issues per year, one double issue and one normal issue per volume.

Vol5, nos2&3 [July 2008] is the first double issue of *The Montana Mathematics Enthusiast*, consisting of ~300 pages of interesting features, dialogues and a critical notice. The feature articles cover the entire scope of topics the journal purports to address, and the diversity of the authors reveals the geographic reach of the journal. This double issue concludes with a preview of articles in the pipeline for vol6,nos 1 & 2 [January 2009] focused on ***Statistics Education and mathematics education research in South America***. We apologize to authors that will have waited for nearly 10 months to see their articles in print but as this editorial indicates, the backlog will soon be cleared up with the double issues. The journal does not have the myriad options and resources that are available through large publishing companies such as making articles available online immediately after acceptance, however the minor discomfort of waiting comes with the benefit of being unshackled to a business corporation, and having a journal that is openly accessible.

The omnibus of feature articles cover topics from the history of mathematics and science, the teaching and learning of specific and general mathematical topics from the middle school onto the university level and for the math enthusiasts three interesting math articles in the domains of geometry (Spyros, article 3), abstract algebra (Diego and Jónsdóttir, article 8), and recreational mathematics (Humble, article 13).

The opening article by Babb and Currie looks at the famous Brachistochrone Problem popularized in Polya's (1954) classic treatise on the role that analogies play in the discovery of, (or for the non-platonists) the creation of solutions to troubling problems. One may recall the elegant solution illustrated by Polya in this book, namely Bernoulli's solution to the Brachistochrone problem by constructing the appropriate analogy with the path of light in the atmosphere. Babb and Currie use the same problem "as a context stretching from Euclid through the Bernoullis" to highlight the variety of results understandable to students without a background in analytic geometry, as well as make ideas from the history of mathematics accessible to students via the use of technological tools. Michael Fried makes a more critical argument on the difficulty of using the history of mathematics in mathematics education, and examines semiotics as a useful bridge to link the two domains. In articles 5 and 6, the teaching and learning of differentiability is addressed from a historical viewpoint (Mayrargue, article 5), and from a cognitive viewpoint (Viholainen, article 6) respectively. This double issue also includes several articles on key mathematical concepts such as inverses (Lim, article 12), foundations (Bagni, article 4), pre-service and in-service mathematics education (articles 10, 11), problem-solving (Ferreira & Palhares article 7), and assessment (Warwick ,article 9). The two Montana feature articles examine the history of logarithms and the birth of insurance mathematics. These pieces may be of interest to high school teachers who are asked by students about the significance of learning logarithms.

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Mathematics education as a field of inquiry has a long history of intertwinement with psychology. In fact one of its early identities was as a happy marriage between mathematics (specific content) and psychology (cognition, learning and pedagogy). However the field has not only grown rapidly in the last three decades but has been heavily influenced and shaped by the social, cultural and political dimensions of education, thinking and learning. To some, these developments are a source of discomfort because they force one to re-examine the fundamental nature and purpose of mathematics education in relation to society. The social, cultural and political nature of mathematics education is undeniably important for a host of reasons such as: Why do school mathematics and the curricula repeatedly fail minorities and first peoples in numerous parts of world? Why is mathematics viewed as an irrelevant and insignificant school subject by some disadvantaged inner city youth? Why do reform efforts in mathematics curricula repeatedly fail in schools? Why are minorities and women under-represented in mathematics and science related fields? Why is mathematics education the target of so much political/policy attention?

The traditional knowledge of cultures that have managed to adapt, survive and even thrive in the harshest of environments (e.g., Inuits in Alaska/Nunavut; Aboriginals in Australia, etc) are today sought by environmental biologists and ecologists. The historical fact that numerous cultures successfully transmitted traditional knowledge to new generations suggests that teaching and learning were an integral part of these societies, yet these learners today do not succeed in the school and examination system. If these cultures seem distant, we can examine our own backyards, in the underachievement of African- Americans, Latino, Native American and socio-economically disadvantaged groups in mathematics and science. It is easy to blame these failures on the inadequacy of teachers, neglectful parents or the school system itself, and rationalize school advantage to successful/dominant socio-economic groups by appealing to concepts like special education programs, equity and meritocracy (see Brantlinger, 2003). The Dialogue included in this issue of the journal examines the No Child Left Behind Act of 2001, the political panacea which was meant to cure the ills of the American public school system and raise student achievement. The Critical Notice of the National Mathematics Advisory Panel Report guest edited by Brian Greer, includes 5 articles which analyze the findings and recommendations of the recently released report (see Greer, guest editorial). The journal welcomes reactions of the readers to the critical notice articles.

In the second edition of the *Handbook of Educational Psychology*, Calfee called for a broadening of horizons for future generations of educational psychologists with a wider exposure to theories and methodologies, instead of the traditional approach of introducing researchers to narrow theories that jive with specialized quantitative (experimental) methodologies that restrict communication among researchers within the field. Calfee also concluded the chapter with a remark that is applicable to mathematics education:

> "Barriers to fundamental change appear substantial, but the potential is intriguing. Technology brings the sparkle of innovation and opportunity but more significant are the social dimensions- the Really Important Problems (RIP's) mentioned earlier are grounded in the quest of equity and social justice, ethical dimensions perhaps voiced infrequently but fundamental to the disciple. Perhaps the third edition of the handbook will contain an entry for the topic." (Calfee, in *Handbook of Educational Psychology*, pp.39-40).

On a concluding note, I am pleased to include in this issue the Introduction of Anna Sfard's *Thinking as communicating: Human development, the growth of discourses, and mathematizing*. The book holds the promise of removing existing dichotomies in the current discourses on thinking, and may well serve as a common theoretical framework for researchers in mathematics education. Again, readers that have or will read the book are urged to submit a reaction to the interesting arguments made by Sfard. Thank you for your support of the journal. I hope you enjoy this issue!

References

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